



## **Cost benchmarking of railway projects in Europe – dealing with uncertainties in cost estimates**

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## **Cost benchmarking of railway projects in Europe – dealing with uncertainties in cost estimates**

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Past experiences in the construction of high-speed railway projects demonstrate either positive or negative financial outcomes of the actual project's budget. Usually some uncertainty value is included into initial budget calculations. Uncertainty is related to the increase of material prices, difficulties during construction, financial difficulties of the company or mistakes in project initial budget estimation, etc. Such factors may influence the actual budget values and cause budget overruns. According to the research conducted by Prof. B. Flyvbjerg, related to investigation of budget in large transport infrastructure projects, 9 projects out of 10 came out with budget overruns.

As an example of cost overruns is the High Speed 1 in UK, the railway line between London and the British end of the Channel Tunnel. The project was delayed for 11 months and final construction costs were escalated to 80%, later on it was investigated that initial calculations and passenger forecasts were overestimated deliberately in order to get financial support from the government and perform this project. Apart from bad experiences there are also many projects with positive financial outcomes, e.g. French, Dutch, Italian projects have productive experiences in constructing and operating high-speed railway lines.

The case study for this research is the first Danish high-speed railway line "The New Line Copenhagen-Ringsted". The project's aim is to avoid cost overruns and even make lower the final budget outcomes by learning from the best practices in construction and implementation of other high-speed lines in Europe in order to become best-in-class project in 2018.

The methodology of this research is based on international benchmarking of construction costs and all information related to the construction (i.e. construction companies and construction materials). Benchmarking was conducted on the three levels. Firstly, the comparison of the average costs per kilometer among selected projects was performed, secondly, the budget models of these projects were distributed by main cost disciplines and finally, unit costs per main cost drivers were compared and analyzed.

There were observed nine railway projects, comparable to the Copenhagen-Ringsted project. The results of this comparison provided a certain overview on the cost range in different budget disciplines. The Copenhagen-Ringsted project is positioned right in the middle between cheaper and more expensive projects in the comparison of total costs per kilometre, although its values in the discipline comparisons are not significantly differ from the values of the cheaper projects.

The deeper analysis of project unit costs is still on-going, but the preliminary results show that the cost values of the projects located in the same geographical zone are slightly the same, e.g. this is explained by the use of the same construction companies presented in the market. However there are still many uncertainties included into received information from the other projects to perform the trustful analysis.